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THE INFLUENCE OF SEGMENTAL MUSCLE MASS ON BDNF RESPONSE TO ACUTE EXERCISE OF VARYING INTENSITIES

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Background and aim. BDNF is a muscle-derived myokine involved in neuroprotection and metabolic regulation. While acute exercise is known to increase this biomarker, the impact of exercise intensity and regional muscle mass on its secretion remains unclear. This study aimed to assess how moderate-intensity continuous exercise (MICE) and high-intensity interval training (HIIT) influence serum BDNF levels, and to explore their relationship with segmental muscle mass.

Materials and methods. Fifteen healthy adults completed both MICE and HIIT sessions. Segmental muscle mass (central, upper, and lower extremities) was measured using bioimpedance analysis. Venous blood samples were collected at baseline, 1 hour, and 24 hours post-exercise. Serum BDNF concentrations were analyzed using ELISA. Correlation and paired comparison analyses were conducted using Spearman's rank correlation, paired t-tests, and Wilcoxon signed-rank tests.

Results. Spearman's correlations showed weak to negligible associations between BDNF levels and regional muscle mass across all time points (ρ range: -0.28 to 0.17; $p > 0.05$), indicating no significant linear relationships. In contrast, paired comparisons revealed statistically significant differences between BDNF levels and muscle mass in all measured regions and time points. Notable mean differences were observed in the central region (e.g., −7.857 kg at baseline, $p = 0.0039$; −9.685 kg at 1 hour post-exercise, $p = 0.0018$), with similar findings across upper and lower extremities under both MICE and HIIT conditions.

Conclusions. Although no direct linear correlations were found, significant region-specific differences suggest that local muscle mass may modulate acute endocrine responses. These findings support the idea that muscle distribution contributes to individual variability in myokine secretion and highlight the potential of personalized exercise strategies to enhance neurobiological outcomes.

Keywords. Exercise intensity; Myokines; BDNF; Segmental muscle mass; Personalized training.